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Generalized Sympathy

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1. Sympathy

Sympathy is a theory proposed by McCarthy (1998) for a parallel analysis of phonological opacity in which a serial derivation has been claimed as the only option in the traditional theories. Let us briefly introduce Sympathy with the data from Tiberian Hebrew discussed by McCarthy. In Tiberian Hebrew, vowel epenthesis and ʔ-deletion occur as shown in (1a&b).

(1) Epenthesis and ʔ-Deletion in Tiberian Hebrew (McCarthy #2)

a. Epenthesis into final clusters:

/melk/ → mele̱x 'king'

b. ʔ-Deletion outside onsets

/qaraʔ/ → qārā 'he called'

c. Interaction: Epenthesis → ʔ-Deletion

/ dešʔ/ → deše̱ʔ → deše 'tender grass'

In (1a), an epenthetic vowel is inserted in a word-final cluster: /melk/ → mele̱x. In (1b), [ʔ] deletes in the coda position. As shown in (1c), the interaction of the epenthesis and ʔ-deletion has been traditionally analyzed in terms of the counter-bleeding order: UR /dešʔ/ first undergoes the epenthesis and then the epenthesized intermediate form [dešeʔ]

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undergoes ʔ-deletion, deriving the surface form [deše]. The actual output includes a gratuitous epenthetic vowel. This type of surface opacity has been a serious problem for parallel versions of Optimality Theory.

To provide a parallel analysis for opacity effects, McCarthy proposes Sympathy Theory. In his theory, one failed candidate is chosen as the model which all the other candidates are required to resemble. Its selection primarily relies on a designated input-output (IO) faithfulness constraint. The model, which is called the sympathetic candidate, must obey the designated IO faithfulness constraint, which is called the sympathy-selector. There are usually several candidates which obey the IO sympathy-selector. Among those obeying the selector constraint, the candidate which is most harmonic with respect to the rest of the constraints is chosen as the sympathetic candidate. In Tiberian Hebrew, the sympathy selector is MAX-C_{IO} which requires the preservation of underlying consonants. [dešeʔ] is the sympathetic candidate since it is the most harmonic one among those which preserve all underlying consonants. Once the sympathetic candidate is chosen, all the other candidates are required to resemble this model candidate through a candidate-to-candidate faithfulness constraint, i.e. Sympathy. In the Tiberian Hebrew example, the sympathetic faithfulness constraint is ⊛MAX-$V_{⊛}$ which requires preservation of vowels of the sympathetic candidate. Notice that an actual output [*deše*] resembles [*dešeʔ*] more than the transparent competitor [*deš*] does in that [*deše*] preserves all the vowels of [*dešeʔ*]. This sympathy analysis of Tiberian Hebrew data is summarized in the tableau (2).

(2) Informal Characterization (slightly modified from McCarthy #11)

	/dešʔ/	CODA-COND	⊛MAX-$V_{⊛}$	MAX-C_{IO}	DEP-V_{IO}
opaque	a. ☞ deše			*	*
transparent	b. ☜ deš		*!	*	
sympathetic	c. ⊛ dešeʔ	*!			*

Regarding the question of why only IO-faithfulness constraints may be the sympathy selector, McCarthy relies on recoverability of underlying representation. The ⊛-candidate obeys a specified IO faithfulness constraint, i.e. the selector; the output is, in turn, required to resemble the ⊛-candidate. Thus, Sympathy may improve recoverability of the input from the output in an indirect way. This selector's restriction to IO-faithfulness constraints is formalized as the Confinement assumption in (3).

(3) Confinement to $C_{<+F>}$ (McCarthy #14)

Selection of the ⊛-candidate is confined to $C_{<+F>}$, the set of candidates that obey the IO faithfulness constraint F.

An additional assumption which is called 'Invisibility' in (4) is necessary in avoiding cyclic dependency in constraint evaluation for the selection of a sympathetic candidate. If sympathetic faithfulness constraints are active in the selection of the sympathetic candidate, the selection process will go into an endless loop. Thus, to solve this problem, McCarthy proposes that sympathetic faithfulness constraints are turned off only at the point of selecting a sympathetic candidate:

(4) Invisibility of ❀-Faithfulness Constraints (McCarthy #15)

Selection of ❀-candidates is done without reference to ❀-faithfulness constraints (on any sympathetic correspondence relation).

A crucial claim in Sympathy Theory is that selection of the ❀-candidate and selection of the actual output take place in parallel. McCarthy discusses a possible objection to this. One might argue that "sympathy covertly reintroduces a kind of serialism." Selection of the ❀-candidate must precede selection of the ☞-candidate since the latter depends on the former. The Invisibility assumption is a consequence of this serialism. However, McCarthy defends parallelism by discussing reduplication and truncation. The fact that "A depends on properties of B" does not necessarily imply that "there is a serial derivation in which B is constructed earlier than A". In reduplication, the reduplicant may resemble the base which is already affected by phonological processes. Nevertheless the effects on the base and reduplicant may be determined in parallel as shown in McCarthy and Prince (1995). In sum, Original Sympathy provides a parallel analysis for opacity effects, crucially relying on conditions like Invisibility and Confinement.

There are some drawbacks to Original Sympathy. First, conditions like Confinement and Invisibility are special: they are not active in any other versions of OT. Second, McCarthy emphasizes that Sympathy is similar to other OT mechanisms for reduplication, truncation, and paradigm uniformity in producing parallel analyses, treatment of over/under-application and so on. But this similarity or parallel behavior is not captured in any direct way. Sympathy, BR-Identity, BT-Identity and OO-Correspondence are all distinct faithfulness constraints. Their parallel behavior is not captured in any formally organized way.

The goals of the present study are to maintain a parallel analysis for phonological opacity, to eliminate special conditions and to capture similarity between Sympathy and other non-IO faithfulness constraints in a more direct way.

2. Proposal

In this paper, we propose a generalized framework for many phonological processes, not just opacity. As schematized in (5), Optimality-Theoretic analyses for reduplication, truncation, paradigm uniformity and opacity all presuppose presence of a pair of representations, one of which may be considered as a base for the other: base/reduplicant, full word/truncatum, simple/derived word, and ❀-candidate/output-candidate:

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(5) Three Phonological Representations involved

$$\begin{tikzcd} & \textbf{I(nput)} \arrow[dl, leftrightarrow] \arrow[dr, leftrightarrow] & \\ \textbf{D(erived)} \arrow[rr, leftrightarrow] & & \textbf{B(ase)} \end{tikzcd}$$

Reduplication	Reduplicant	Base
Truncation	Truncatum	full word
Paradigm Uniformity	Derived word	simple word
Opacity	Output-candidate	❀-candidate

For the convenience of explanation, let us call the former B(ase) and the latter D(erived). In these processes, the project for phonology would be to determine the right pair of representations by checking similarities among three forms—I(nput), B(ase), D(erived)—and the markedness of each of the forms. Generalizing this reasoning, I first propose that Gen generates candidates, each of which consists of a pair of representations, i.e. B/D. Second, each constituent representation of a candidate is evaluated by markedness constraints. Third, different faithfulness constraints are imposed on the identity among I, B, and D: i.e., IB, BD, and ID faithfulness. IO, BR and IR faithfulness constraints employed in the analyses of reduplication correspond to IB, BD and ID faithfulness constraints respectively. Finally, no special conditions like Invisibility are called on in candidate evaluation. In this generalized approach which we call "Generalized Sympathy", opacity occurs when one IB Faithfulness constraint and one BD Faithfulness constraint are dominant in the ranking. The tableau (6) shows a Generalized Sympathy analysis of Tiberian Hebrew data.

(6) Generalized Sympathy analysis of Tiberian Hebrew [deše]

/dešʔ/	MAX-C_{IB}	MAX-V_{BD}	*COMPLEX	CODA-COND	DEP-V_{IB}
a. ☞ deše (dešeʔ)				/*	*
b. ☜ deš (dešeʔ)		* !		/*	*
c. dešʔ (dešeʔ)		* !	*/	*/*	*
d. dešeʔ (dešeʔ)				*/* !	*
e. deše (dešʔ)			/*!	/*	
f. deše (deše)	*!				*
g. ☜ deš (deš)	*!				

In each candidate, B is put within parentheses. Each constituent of a candidate may be evaluated separately from the other: for example, the candidate (6a) commits a single violation of CODA-COND since its B [dešeʔ] has an illegal coda [ʔ] while the D does not. "/" is used to separate violations of D and B. In (6f&g), the B lacks the final [ʔ], violating a dominant MAX-C_{IB}; thus they drop from the competition. The B in (6e) obeys the

MAX-C_{IB}, but does not have an epenthetic vowel, violating a phonological constraint *COMPLEX. We may thus consider [dešeʔ] in (6a-d) as the optimal B. Another dominant constraint is the BD Faithfulness constraint, MAX-V_{BD} demanding D's preservation of vowels from the B. (6a&d) obey the constraint since in these candidates, D preserves all vowels from B. (6d) cannot be optimal since both B and D have an illegal coda [ʔ], incurring double violations of CODA-COND. Notice that the optimal candidate (6a) incurs a single violation of CODA-COND which is indispensable for the satisfaction of a dominant MAX-C_{IB}. Thus, the actual output is [deše]. Here we assume that B is normally invisible at the surface except in cases like reduplication. For reduplication, we may assume a morphological constraint like "B of reduplicant must be visible."

Before going any further, we should check whether or not the proposed mechanism can derive transparent outputs. As shown in (7a), in a language like Tiberian Hebrew, phonological constraints must outrank ID-Faithfulness constraints to derive phonological effects of vowel epenthesis and ʔ-deletion.

(7) Rankings for opaque and transparent outputs

a. Phonological changes: /melk/ → [melex], /qaraʔ/ → [qārā]

Phono C		ID-Faith	
*COMPLEX	>>	DEP-V_{ID}	⇒ Epenthesis
CODA-COND	>>	MAX-C_{ID}	⇒ ʔ-deletion

b. Opacity effects

IB-Faith: MAX-C_{IB}						
	>>	Phono C	>>	ID-Faith	⇒ Opacity	
BD-Faith: MAX-V_{BD}						

c. Some transparent effects

(i) BD-Faith	>>	Phono C	>>	**IB-Faith**, ID-Faith		
MAX-V_{BD}				MAX-C_{IB}		
(ii) IB-Faith	>>	Phono C	>>	ID-Faith	>>	**BD-Faith**
MAX-C_{IB}				DEP-V_{ID}		MAX-V_{BD}

More specifically, vowel epenthesis results from *COMPLEX outranking DEP-V_{ID}; ʔ-deletion results from CODA-COND outranking MAX-C_{ID}. In addition, as shown in (7b), if one IB-Faithfulness constraint, MAX-C_{IB} above, and one BD Faithfulness constraint, MAX-V_{BD} above, are dominant, opacity effects can be seen. Actually, the BD Faithfulness constraint does not have to be strictly dominant; its ranking over the ID Faithfulness constraint would be sufficient. Now if both IB and BD Faithfulness constraints are not dominant, i.e. at least one of them is lower-ranked, transparent outputs would be derived. Two example rankings are shown in (7c). In (7ci), the IB-Faithfulness constraint is not dominant; in (7cii), the BD Faithfulness constraint is not dominant; more precisely, it is outranked by the ID Faithfulness constraint. Analyses of hypothetical transparent cases based on Tiberian Hebrew are shown in (8) and (9).

(8) Hypothetical Transparent Case One

/dešʔ/	MAX-V_{BD}	*COMPLEX	CODA-COND	MAX-C_{IB}	MAX-C_{ID}	DEP-V_{IB}	DEP-V_{ID}
a. deše (dešeʔ)			/* !		*	*	*
b. deš (dešeʔ)	* !		/*		*	*	
c. dešʔ (dešeʔ)	* !	*/	*/*			*	
d. dešeʔ (dešeʔ)			*/* !			*	*
e. deše (dešʔ)		/*!	/*		*		*
f. deše (deše)				*	*	*!	*
g. ☞ deš (deš)				*	*		

In (8), MAX-C_{IB} is outranked by CODA-COND; thus, an illegal coda [ʔ] must drop both in D and B. (8f&g) have no coda [ʔ], obeying CODA-COND. However, (8f) includes a gratuitous epenthetic vowel, violating DEP-V. Thus, the optimal candidate is (8g), and the actual output is [deš].

In (9), MAX-C_{IB} is dominant; thus, [dešeʔ] is an optimal B as in the analysis of the opaque case in (6). However, BD Faithfulness, MAX-V_{BD}, is ranked below the ID Faithfulness constraint, DEP-V_{ID}; thus, insertion of a gratuitous epenthetic vowel must be avoided. (9b) is the optimal candidate whose D [deš] does not have a gratuitous epenthetic vowel.

(9) Hypothetical Transparent Case Two

/dešʔ/	MAX-C_{IB}	*COMPLEX	CODA-COND	MAX-C_{ID}	DEP-V_{IB}	DEP-V_{ID}	MAX-V_{BD}
a. deše (dešeʔ)			/*	*	*	* !	
b. ☞ des (dešeʔ)			/*	*	*		*
c. dešʔ (dešeʔ)		*/ !	*/*		*		*
d. dešeʔ (dešeʔ)			*/* !		*	*	
e. deše (dešʔ)		/*!	/*	*		*	
f. deše (deše)	*!			*	*	*	
g. deš (deš)	*!			*			

Consequently, Generalized Sympathy may derive both opaque and transparent outputs. Its advantages are as follows. Special conditions like Invisibility are not needed. Similarities among Sympathy, BR-Identity, BT-Identity, and OO-Correspondence are directly captured since they are in fact the same faithfulness constraints. Finally, parallelism is explicitly incorporated; it is thus not subject to the same possible objection to Original Sympathy, i.e. covert reintroduction of serialism.

Let us now discuss how to reinterpret Original Sympathy's sympathy-selector in the present proposal. In (6), it is implicit that MAX-C_{IB} outranks MAX-C_{ID}. This relative ranking between IB and ID faithfulness constraints is crucial. It plays the same role as specification of the sympathy selector in Original Sympathy. Thus, the ranking should not be accidental. I propose a universal ranking, i.e. that an IB faithfulness constraint always outranks its corresponding ID faithfulness constraint. This universal ranking may be justified on the basis of previous works on Sympathy, Reduplication and Truncation.

In Original Sympathy, according to the Confinement Assumption, a certain low-ranked IO-faithfulness constraint becomes dominant only in the selection of the sympathetic candidate. So, this IO-faithfulness constraint is higher in ranking for selection of a sympathetic candidate, i.e. B in Generalized Sympathy, than an actual output candidate, i.e. D in Generalized Sympathy. Informally speaking, B must resemble I(nput) more than D. More formally, the IB faithfulness constraint must outrank its corresponding ID faithfulness constraint.

In their correspondence analyses of reduplication, McCarthy and Prince (1995) claim that the IB faithfulness constraint always outranks its corresponding IR faithfulness constraint, i.e. ID faithfulness in Generalized Sympathy. Also, in her correspondence analyses of truncation, Benua (1995) claims that there are no IT faithfulness constraints, i.e. ID faithfulness constraints in Generalized Sympathy.[1] Absence of IT faithfulness vacuously leads to ranking IB faithfulness above IT faithfulness. There are two points to be noticed. First, different universal rankings proposed for different processes converge into a single ranking in Generalized Sympathy. Second, by ranking IB faithfulness above ID faithfulness, we may maintain McCarthy's justification for Original Sympathy, i.e. recoverability. Recall that McCarthy claims that Original Sympathy indirectly improves recoverability of the input from the output by employing the IO-faithfulness sympathy selector.

Let us move on to cases which require a markedness sympathy selector, as claimed by Itô & Mester for their analysis of German Truncation. Notice that justification for an IO-Faithfulness selector in Original Sympathy is recoverability; thus, a non-IO-Faithfulness selector cannot be justified in the same way.

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[1] Contrary to Benua, Shin (1998) claims that IT faithfulness plays a crucial role in Kyungsang Korean truncation.

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3. German Truncation

The following discussion of German Truncation data is solely based on Itô & Mester (1997). In their analysis, what is relevant to us is that a markedness constraint is employed as a sympathy selector. The data is shown in (10).

(10) Data

a. Maximized clusters

Hans	Hansi
Gorbatschow	Gorbi
Stoltenberg	Stolti
.....	.....

b. Non-maximized clusters

Andreas	Andi
Benjamin	Benni
Gabriele	Gabi
Ulrich	Ulli
Imker	Immi
.....	.....

In (10a), all intervocalic consonants of full words survive in the corresponding truncated forms. In contrast, in (10b), not all intervocalic consonants of full words survive in the corresponding truncated forms. The generalization here is that "...the bare truncatum (i.e., the shortened form without the suffix -i) must be not only a possible syllable of German but also the <u>maximal syllable</u> extractable from the base..." For example, as shown in (11), [rb] in 'gorb' is a possible coda cluster but [br] in 'gabr' is not; thus 'Gorb-i' is O.K. but 'Gabr-i' is not.

(11)

Gorb-i	Gab-i	And-i
√ <u>gorb</u>.<acof>	* gabr.<iele>	* andr.<eas>
	√ <u>gab</u>.<riele>	√ <u>and</u>.<reas>

To analyze this data, Itô & Mester employ the following constraints:

(12) Constraints

a. All-σ-Left: Align(σ, Left, PrWd, Left)

b. NonFinality: No head-σ of PrWd is final in PrWd.

All-σ-Left in (12a) is the Sympathy selector constraint. It says "Align left edge of a syllable with left edge of the prosodic word." To maximally satisfy All-σ-Left, only a single syllable may survive. As can be seen in tableau (13), [and] is chosen as a sympathetic candidate since it obeys All-σ-Left and violates Max-IO minimally.

(13) Sympathy analysis

I: /andreas + i/	NonFinality	Dep-$\circledast$O	Max-IO	All-σ-Left$^{\circledast}$
a. $\circledast$ and	* !		reasi	
b. an	* !		dreasi	
c. a	* !		ndreasi	
d. i	* !	i	andreas	
e. ai	* !	i	ndreas	
f. a.ni		i	dreas!	σ
g. ☞ an.di		i	reas	σ
h. an.dri		ri !	eas	σ
i. an.dre.a.si		re!asi		σσσ

NonFinality in (12b) has the effect of having at least two syllables since, to avoid a final head syllable, at least one non-head syllable needs to be located finally. In (13), [an.di] is an optimal output since it obeys dominant NonFinality and incurs the fewest violations of a sympathetic faithfulness constraint Dep-$\circledast$O. In this analysis, instead of positing a truncation morpheme, Itô & Mester assume that "the overt truncation affix /-i/ is specified with the lexical requirement $C^{\circledast}$= ALL-σ-L..."[2] In other words, they assume a morpheme-specific sympathy selector.

We will now provide a Generalized Sympathy analysis of German Truncation, basically adopting all the ideas underlying Itô & Mester's analysis. Recall that Itô & Mester assume All-σ-Left is a morpheme-specific sympathy selector. A sympathy selector in Original Sympathy may be translated into a dominant constraint on B in Generalized Sympathy. Since this constraint needs to be applied only to B, it will be represented by All-Bσ-Left. The proposed ranking is shown in (14).

(14) Ranking: All-Bσ-Left >> NonFinality >> DEP_{BD} >> Max_{IB}

As can be seen in the tableau in (15), the optimal B, [and], obeys All-Bσ-Left which is the sympathy selector in Itô & Mester's analysis.

(15) Generalized Sympathy analysis

/andreas + i/	All-Bσ-Left	NonFinality	DEP_{BD}	Max_{IB}
a. ☞ an.di (and)		/*	i	reas
b. an.dri (an.dre)	*!		i	as
c. an.dri (and)		/*	ri !	reas
d. a.ni (an)		/*	i	dreas !

The BD Faithfulness constraint DEP_{BD} plays the same role as the sympathetic faithfulness constraint Dep-$\circledast$O in Itô & Mester's analysis. (15) is not crucially different from (13).

2 In this analysis, Ito & Mester employ Sympathy alone, not with BT-Identity; thus, their analysis may be regarded as a generalized approach for Sympathy and Truncation.

Thus, it seems that Generalized Sympathy explains German Truncation at least as well as Itô & Mester. Moreover, the Generalized Sympathy analysis has some advantage over Itô & Mester's. Within Original Sympathy, Itô & Mester's analysis of German Truncation is special since it employs a non-IO Faithfulness sympathy selector. Recall that the justification for an IO-Faithfulness selector in Original Sympathy is recoverability; thus, a non-IO Faithfulness selector cannot be justified in the same way. In contrast, the Generalized Sympathy analysis just presented is not special in any comparable sense. One might think All-Bσ-Left is special since it is a B-specific constraint. However, All-Bσ-left is comparable to morpheme-specific prosodic-delimiter constraints like RED=CVC which are typically called up in reduplication and truncation. All-Bσ-Left is clearly a prosodic (or size) delimiter. The difference is in the target of the constraints. Constraints like RED=CVC are only for D whereas All-Bσ-Left is for B. Notice that All-σ-Left$^{⊛}$ in Itô & Mester's analysis is also morpheme-specific constraint. We will see more of this kind of constraints on B in the next section on Paradigm Uniformity.

4. Paradigm Uniformity

Morphologically-related words often display phonologically-unexpected resemblances. A well-known English example is còmp[ə]nsátion vs. cònd[ɛ]nsátion in which the unstressed FULL vowel of the latter is due to the stressed vowel of its base *cond[ɛ́]nse* (cf. cómp[ə]nsate). This type of effects which have been referred to as "cyclicity effects" are analyzed within the OT framework in terms of Output-to-Output faithfulness constraints: Paradigm Uniformity (Steriade 1994, 1996, to appear), Base-Identity (Kenstowicz 1996), Out-output correspondence (McCarthy & Prince 1995; Benua 1995) and so on. In the previous analyses, there is typically a model form which its morphologically-related forms are supposed to resemble. Different types of models have been employed. First of all, the model must be an actual output, i.e. an independent word. It is most often the isolation form of the base which is a subconstituent of the actual output. Moreover, Steriade (1994) and Crosswhite (1996) show that it could be either remote or proximate. As shown in (16), in Chamorrow, "...any form with main stress on a closed syllable will continue to have main stress on a closed syllable in derivatives."

(16) Chamorrow (Crosswhite #4, ´ : primary, ` : secondary stress)

	simplex	affixed once 'abounding in X'	affixed twice 'more abounding in X'	gloss
a.	´lebblu	´mi`lebblu	`mileb´blonɲa *`mileb´bloɲa	'book'
b.	´batku	´mi`batku	`mibat´konɲa *`mibat´koɲa	'boat'

Notice that in (16a) gemination of the doubly-affixed form, [nɲ], is due to its corresponding simplex form with a geminate [bb], not to a singly-affixed form. So, the model of Paradigm Uniformity is a remote base. In contrast, stress preservation of a doubly-affixed form is sensitive to a singly-affixed form; thus, the model is the proximate base. Also, the model could be an affixed, not isolation, form of the base. According to Steriade (to appear), the stress pattern of English words which can take *-able* as a suffix *custódi-able* and *remédi-able* is due to the existence of morphologically-related words like *custódi-al* and *remédi-al*. These words are in contrast with the improbable form **paródi-able*: **paródi-al* is not an existing word and thus, *párodi-able* is the only possible word which is due to the existence of a word *párody*. Finally, the model could be a particular allomorph of a given paradigm which cannot be a subconstituent of the actual output. One example is Polish vowel raising analyzed by Kenstowicz in which the nominative singular form is the model of Paradigm Uniformity with respect to vowel raising.

In sum, models may vary in Paradigm Uniformity. These models are often directly mentioned in the statement of Output-Output faithfulness constraints. In other words, what kind of model is employed is stated in each constraint. For instance, in Kenstowicz's Base-Identity, the model must be an independent word (17a); in Match constraints proposed by Crosswhite, whether the model is remote (17b) or proximate (17c) is specified.

(17) a. Base-Identity (Kenstowicz #12)
Given an input structure [XY] output candidates are evaluated for how well they match [X] and [Y] if the latter occur as **independent** words

b. Match(HEAD LENGTH) (Crosswhite p. 60)
For any lexical item α, the **remote** derivational predecessor of another lexical item β, if the vowel of the prosodic head of α is short, the vowel of the prosodic head of β must also be short

c. MATCH(STRESS) (Crosswhite p. 65)
For a lexical item α, the **proximate** derivational predecessor of another lexical item β, if a given syllable of α bears stress, then the derivationally corresponding syllable of β must also bear stress.

In principle, constraints may be different only in the model employed. Thus, the model is, in some sense, independent of OO faithfulness constraints. To capture the model's independence, we need to separate the model from the constraints.

In Generalized Sympathy, the model of Paradigm Uniformity is B. OO faithfulness constraints are BD faithfulness constraints. To get the correct models in Paradigm Uniformity, we may propose constraints on B like those in (18).

(18) A sample constraint of the model (i.e. B in Generalized Sympathy)

B must not be a morphologically-unrelated form of the Input.
⇒ *B=morphologically-unrelated form

Additionally, the following are possible constraints: B must not be a morphologically-related form of the Input; B must not be an independently occurring word and so on. Furthermore, if there are any preferences (or markedness) of the model, they may be captured by a universal ranking of the constraints on B just like segmental or prosodic markedness are claimed to be captured by a universal ranking of markedness constraints, for example, *Mar/vowel >> *Mar/nas >> *Mar/stop. At least some markedness of the model has been already discussed in the literature. The most common (thus unmarked) model in Paradigm Uniformity is the isolation form of the base (Kenstowicz 1996, Steriade 1996). This markedness may be captured by a universal ranking: *Affixed_B (B must not be an affixed form) >> *Isol_B (B must not be an isolation form). Also, Kenstowicz, citing Bybee (1985), states that, in case a particular allomorph needs to be the model, the unmarked one of a given paradigm is selected as the model. In his analysis of Polish vowel raising, Kenstowicz considers the nominative singular as the unmarked. This markedness may be captured by a universal ranking: *marked_allomorph_B (B must not be a marked allomorph) >> *unmarked_allomorph_B (B must not be an unmarked allomorph). Although we still need to know what determines markedness of allomorphs, it seems plausible that one particular allomorph may be considered unmarked compared to the other allomorphs of a given paradigm. If such markedness of the model exists, then it is hard to capture in the conventional approach in which the model is directly specified in OO faithfulness constraints as in (17).

Under Generalized Sympathy, Paradigm Uniformity is simply a case in which B is an actual output word occurring in a given paradigm; in other words, *B=not_independent_word (B must be an independently occurring word) is dominant. A Generalized Sympathy analysis of "comp[ə]nsation vs. cond[ɛ]nsation" is shown in (19).

(19) Generalized Sympathy analysis of "compensation vs. condensation"

a. Constraints

V-Rd: Unstressed vowels must be reduced

MAXf-$\acute{v}_{BD}$: Place features of a stressed vowel of the B must be preserved in the D.

b. analysis (condensation)

/condense+ation/	*B=not_indp_Wd	MAXf-$\acute{v}_{BD}$	*B=indp_Wd	V-Rd
i. ☞ cònd[ɛ]nsátion- (cond[ɛ́]nse)			*	*
ii. cònd[ə]nsátion - (cond[ɛ́]nse)		* !	*	

c. analysis (compensation)

/compensate+ion/	*B=not_indp_Wd	MAXf-$\acute{v}_{BD}$	*B=indp_Wd	V-Rd
i. ☞ còmp[ə]nsátion-(cómp[ə]nsàte)			*	*
ii. còmp[ɛ]nsátion-(comp[ɛ́]nse)	*!			*

Crucial dominant constraints are *B=not_indp_Wd (B must be an independently occurring word) and MAXf-$\acute{v}_{BD}$ which demand D's preservation of vowel place features of B. In (19b), B (cond[ɛ́]nse) is an independent word; thus, a dominant *B=not_indp_Wd is not violated. In (19cii), B (comp[ɛ́]nse) is not an independent word; thus, the dominant constraint is violated.

5. Remaining Problems

Let us finally consider remaining problems. In the present theory, a candidate consists of a single D and a single B. Thus, it cannot directly deal with multiple opacities which can be seen in Yokut vowel harmony and lowering discussed by McCarthy. Multiple opacity cases require more than one sympathetic candidate; thus, in Generalized Sympathy, more than one B is required, although there is only one slot available for the B. In addition, Steriade (to appear) shows that Paradigm Uniformity effects in French determiners and BR identity in Bantu reduplication require more than one model for the analysis. Thus, it seems true that at least some attested cases of phonological opacity, Paradigm Uniformity and Reduplication cannot be analyzed within Generalized Sympathy, in which only a single B is allowed. One possible solution for this problem would be simply to add more B's. At this moment, I will leave the elaboration of this idea to future research.[3]

Also, the range of derivable data definitely increases within the present theory. For instance, in conventional OT, phonological effects can be seen when phonological constraints outrank IO Faithfulness constraints. However, in Generalized Sympathy, even when phonological constraints outrank ID Faithfulness constraints, phonological effects may not always be seen. If both IB and BD Faithfulness constraints are dominant, the absence of phonological effects in B must be transferred to D. This may be considered a case of underapplication.

[3] Addition of more B's would cause a serious problem for the restrictiveness of the present theory. Notice that even with one B the range of derivable data greatly increases, as will be briefly discussed in the next paragraph of the main body of this article.

In conclusion, it is obvious that the present study cannot be considered as a fully developed theory of phonological opacity, not to mention phonological processes in general. Nonetheless, we want to emphasize that our theory is much simpler and more general than Original Sympathy, since many special properties of Original Sympathy which cannot be seen in any other versions of OT disappear. We believe that if one tries to develop Original Sympathy into a simpler theory with more generality, s/he should take the direction offered by the present study.

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